DEVELOPMENT IN ZIMBABWE

'Education is the hammer of skill'

The Role of the University

A Lecture Series at the University of Oslo
June 1 st — June 8 th, 1983

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FOREWORD

This is a compilation of a series of lectures given at the University of Oslo in June 1983 by staff members of the University of Zimbabwe. They participated in a delegation to the University of Oslo to explore the opportunities for building academic contacts between individuals and departments at the two Universities. Their visit constituted one important step in a long process of developing the content and format of a collaborative program between the University of Oslo and the University of Zimbabwe, the first "case" in the general efforts of the University of Oslo to establish new forms of academic cooperation with the third world.

It was felt natural at the time of this first extended visit from Zimbabwe that the 9 members of the delegation should provide information about the current activities and plans of their respective departments/faculties. The lectures were given over five consecutive days and were open to anyone interested. All contributors agreed to the proposal of having the lectures distributed afterwards, first and foremost at the University of Oslo as a contribution to the mutual exchange of information among staff and students.

Due to logistic and administrative reasons it took much longer that intended to get the various papers ready for presentation. In the period that has passed, many developments have taken place at the rapidly expanding University of Zimbabwe. The papers should therefore not be taken as reflecting the situation today in all aspects. Nevertheless, the broad lines of the basic philosophy of and challenges to the University of Zimbabwe are well reflected in the papers even if certain specific informations may be somewhat outdated.

Food, Nutrition and Development

Ms. M.I.Gomez, lecturer, Faculty of Science

I would like to take this opportunity to thank the University of Oslo on behalf of myself and the University of Zimbabwe, and in particular RIU who planned the initiatives of this co-operation programme and made our visit to Oslo possible. I would also like to follow the format used by my collegues in introducing myself and the organisational context in which I represent the University of Zimbabwe, on this mission.

I am Senior Lecturer in Food Technology, in the Department of Biochemistry and am currently co-ordinating a very newly established programm, an M.Sc. Post-graduate course in Food Science. This programme was conceived and is being implemented now as an inter-faculty programme between the Faculties of Agriculture and the Faculty of Science, within the Departments of Animal Science and of Biochemistry respectively.

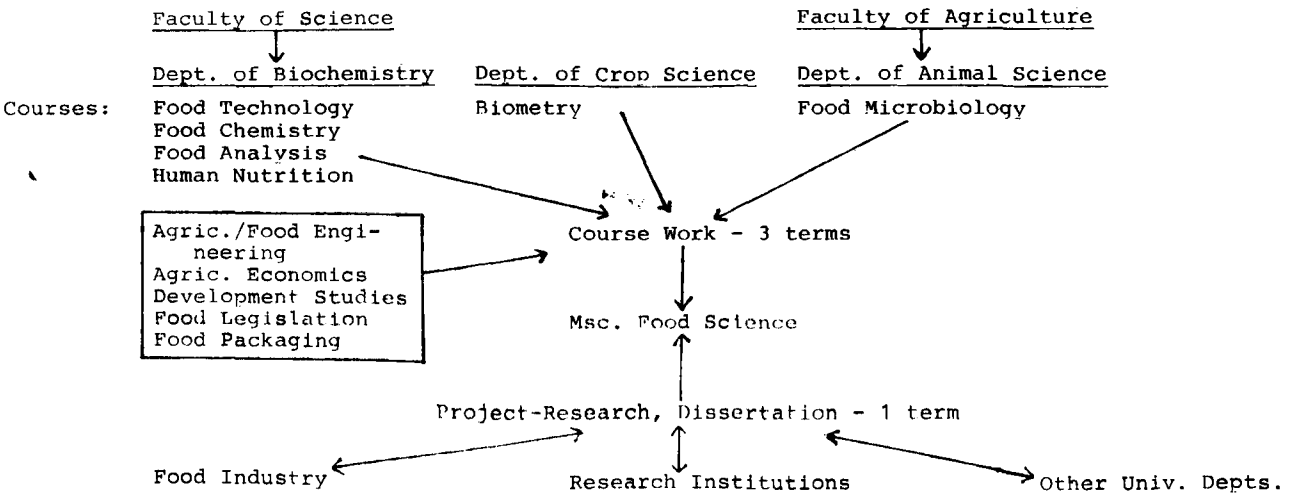
The M.Sc. Food Science course was conceived about the period 1981, soon after independence and was actually established in response to stimuli from both within the University and outside. The course was launched for the first time in March '82 and it is clear therefore that being essentially in a development and growth phase ourselves, we are looking into every

means by which we can improve and strengthen our teaching capacity and the national impact of the programme, mainly in effective translation of our teaching, training and research effort into National development goals. Therefore, whatever the present limitations, it is undoubtedly one of the most opportune and relevant programmes, in relation to the urgent and enormous task of ensuring a safe, nutritious and adequate supply of food for the people of Zimbabwe.

The M.Sc Food Science course is presently a one year course based in two departments and even though the organisational and structural aspects of the course need re-thinking, the initiatives in establishing the course are to be commended, because I think the most difficult part of a development venture is to get things started and off the ground. Once a base is established the supporting resources develop. So even with limited resources and modest staffing, the commencement of a programme of Food Science at the University of Zimbabwe was indeed a very timely step towards establishing a professionally trained man-power base in an area of vital importance to the food supply of the country.

To revert to the structure of the programme, Fig. I illustrates the breakdown of the major subject areas currently taught in the course and the departmental distribution. These inputs go into a course work component of three terms followed by a 12 week period on a special study project. The project is intended to give students a training in problem identification and solving, in research methodologies, in data collection and evaluation, scientific writing and reporting and in orientation to industrial and other practical situations. In identifying and selecting projects for the first batch of students we took the approach of co-operating with the Food Industry. However, we expect to extend this co-operation to other agencies involved with Food and Nutrition such as the Agriculture Re-

Fig. I. Curricular Structure of the M.Sc. Science Programme.



search Institutes and to other University departments as well. For example, the scientists at the Crop Science Department of the University are engaged in Cassava breeding and selection studies. They would like to have the quality and utilization aspects investigated. One utilization possibility of interest is that of using Cassava as a carbohydrate substitute for maize in brewing. Maize is the staple food in Zimbabwe and unless large surpluses of maize are available it is unwise to permit industrial uses of maize to compete with the food uses. The use of other carbohydrate sources such as Cassava as a substitute in beer brewing could release substantial quantities of maize for direct human consumption. This example I hope gives you an idea of the type of projects we are working on and of the nature of the problems.

If we look at Figure I again, the left-hand side represents inputs that we expect we could introduce as the programme develops; these include Agriculture and Food Engineering, Agriculture and Food Economics and some inputs of sociology and development studies. Food Legislation is another important supporting course in any Food Science programme. Food legislation is assuming a great deal of importance both in relation to the domestic food supply as well as for securing export markets for our raw, semi-processed and processed foods and monitoring the quality of imported foods. These are some of the inputs we would like to introduce into the programme in the future in order to expand the scope and impact of the programme.

Having outlined the nature of the training offered in the Food Science course it would be appropriate to give a brief overview of the agricultural production and food supply situation, , since the way in which the food production and supply is organised has a very critical bearing on food consumption, food utilisation and food in the context of national development

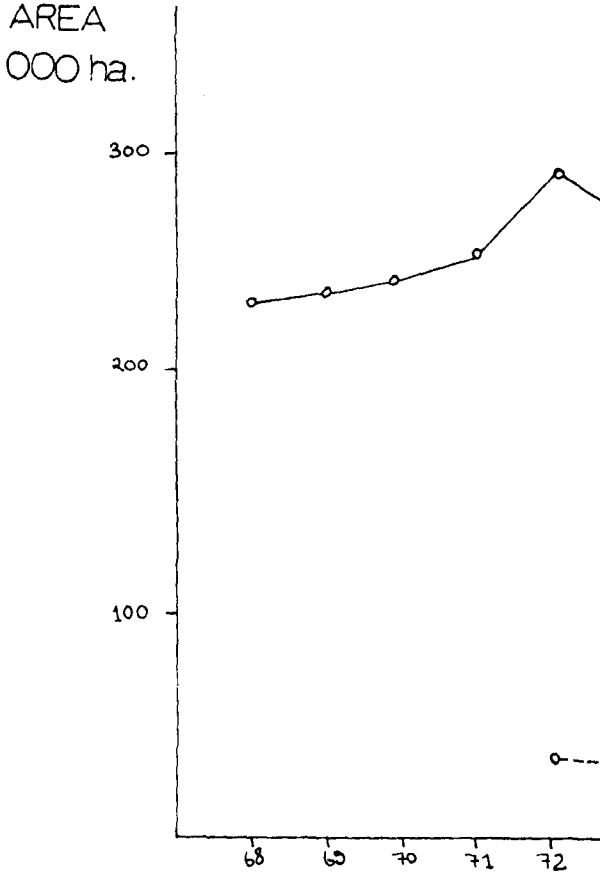
The situation in Zimbabwe is fairly unique in the sharp dual economy and the division of the production sector into a large well organised commercial sector and a small rural sector. The population pattern is however the reverse of the production pattern- the rural or communal sector representing 57-58% of the total population. This is rather unique for the African countries of the region where the agricultural base is characterized by small-scale farming.

Agricultural land is categorized on the basis of its production potential on factors such as rain fall and other climatic factors into five natural regions. The table illustrates the distribution of these regions among the commercial and the communal or rural sectors and the percentage of land covered by each of the sectors and the percentage of land covered by each of the sectors. So although you see a fairly even distribution in terms of the total percentages, I would like to draw your attention to the fact that as you proceed from region 3 to region 5, there is a gradual decline in productivity of the land and the greater part of the communal farming land is located in these areas while the greater part of the commercial farm lands occupy Region 2. This basic difference is therefore reflected in the whole production pattern and economy.

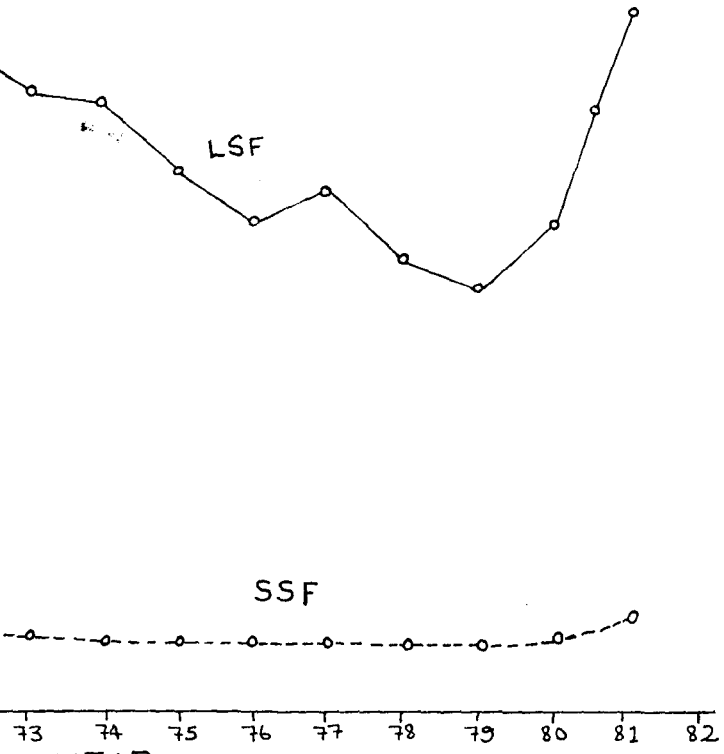
The differential in productivity between the commercial and the small scale sectors is illustrated also in specific crop production statistics as shown in Fig. 2. One of the major thrusts of national development plans is to reduce this differential and to increase the productivity of the rural sector, through more rational land distribution, extension services, credit facilities and other support systems. It is to be noted however, that Zimbabwe is in a favourable position in that the basic staple food, maize, is produced predominantly by the

Fig. 2

COMMERCIAL



MAIZE AREA



LSF_Large Scale Farm

SSF_Small Scale Farm

commercial farm sector and to this extent a certain level of food security is assured since production is not as much subject to the uncertainties and vagaries that affect the small producer. This very favourable factor in relation to the production of the staple crop is to some extent counter-acted by some other natural factors, basically climatic factors such as the recurrent cycle of droughts and the need therefore for always maintaining national buffer stocks of food to meet the threat of drought. Also the uni-modal system of rain fall which imposes a need for a very stringent and critical control and conservation of the food supply from one growing season to the next. So both these factors, the recurrent cycle of droughts and the uni-modal system of rainfall are two major factors that have to be taken into consideration in planning for food availability throughout the year and for overcoming seasonal food deficits.

Food Resources:

Maize is the major cereal crop while other minor cereals are grown to a lesser extent. In good production years such as '82, Zimbabwe's maize production stood at about two million tonnes, with an exportable surplus. The next important crop is wheat, while the traditional cereal crops such as sorghum and millets have assumed a secondary place in the diets. Sorghum and millets are in fact two nutritionally superior cereals but have lost their place in the diets with the adoption of maize.

Of the oilseed and vegetable protein crops, soya bean is the largest, with an annual production of about 90,000 tonnes. Other oilseed crops are sunflower, cottonseed and groundnut. Groundnut has not been developed as a commercial crop and is still cultivated as a traditional crop in the communal lands, though increasingly it has been grown as a cash crop rather than for domestic utilization. The drop in production and

utilization of and excellent oil and protein crop such as groundnut is a cause for concern.

Zimbabwe enjoys a tropical climate and is very well suited for the cultivation of a large number of tropical and semi-tropical fruit and vegetable crops. The horticulture industry has hitherto been more or less confined to mainly temperate fruit and vegetable crops such as apples, peaches pears, cabbage, peas and beans.

Many tropical species such as mango, papaya and cassava have not been developed, even though they have excellent potential for upgrading, for local consumption and for export markets.

Livestock production is largely in the hands of the commercial sector, except for poultry and goats which are reared as meat animals in the communal areas. Recent schemes have been initiated to increase the production capacity of the rural sector as for example the rural milk production scheme.

The Food Industry.

Zimbabwe has a very well established food industry which has contributed for a long time in a very significant way to the gross national product. In 1981, it was estimated to be the largest industrial manufacturing sector with an annual turnover approaching a billion dollars. The Cereal, oil and sugar milling industries are well established in Zimbabwe. Meat and milk processing are the responsibility of parastatal organisations. The Cold Storage Commission and the Dairy Marketing Board respectively, except that the Cold Storage Commission does not actually engage in the processing of meat products but is mainly a national slaughter house concentrating on slaughter, storage and marketing of meat.

Brewing, baking confectionary and beverage industries are

also well established and some of these products have recently entered export markets.

However, except for such basic food items such as maize meal, milk, oil, sugar, tea and coffee most proceessed foods are beyond the purchasing power of the majority of the people and it could be safely assumed that the Food Industry serves mainly the urban markets.

It is appropriate to mention here that among the forces that stimulated and assisted in the establishment of the Food Science programme, indeed, the Food Industry played a major role. This was an indication that the Food Industry itself was beginning to feel the need for this manpower resource and the need for certain specialized skills in areas such as quality control and product development.

Nutrition:

In Zimbabwe as a whole, very few nutritional studies have been carried out on a nation wide scale. A couple of studies have been done in limited or restricted areas. The problems are however not very different from those of other developing countries. One of the major problems is that of child nutrition mainly malnutrition among the under-five age group arising from the practice of weaning from breast milk to high carbohydrate diets. Maternal nutrition problems similarly follow the same pattern as in many other developing countries, Iron deficiency anemias being one of the more serious problems. A third vulnerable group that has been identified in recent times are the commercial farm workers i.e. the resident farm labour on commercial farms. A number of studies have drawn attention to the fact that the nutritional status of these people leaves a lot to be desired and undernutrition has been reported among several farm worker communities. This is understandable, since these groups have been uprooted from their

traditional and subsistence sources of food, they have no recourse to their traditional foods and their purchasing power does not permit them to get adequate supplies of the commercial foods. Therefore there is this group also to be considered.

Besides such socio-economic factors, other environmental factors contribute to nutritional problems in Zimbabwe, notably Iodine deficiency, arising from low iodine levels in the soil and consequently in foods and inadequate intake of marine foods. High goitre prevalence rates have been reported in some areas of Zimbabwe.

Having outlined the background and highlighted some of the food and nutritional problems, what exactly then is the role of the University and Food Scientists specifically in national development? The most central role of the University in national development and one that deserves the highest priority is human resource development and the provision of academic and professional training at the tertiary level. It has to be emphasised that the University is also a training ground for technical personel and middle level techinicians. Technicians with anything more than highschool and some polytechnic training are rare. Therefore a great deal of on-the-job training has to be undertaken at the University.

Research & extension.

A research programme has already been initiated within the Food Science programme. Research interests are directed at utilisation of underutilised food resources such as Soya bean meal, the development of indigenous and neglected food resources such as Bambara Ground nut and of simple low-cost food preservation technologies such as Solar drying.

The M.Sc Special study projects are all of a practical applied

research nature and are based on problems identified in the Food Industry. In the future it is expected to extend these projects to other Food and Nutrition problems through co-operation with Government Ministries such as Agriculture and Health. The need for the University to be involved in an extension function has been clearly recognised but the exact system of implementation and operation of such extension programmes is not so clear. As emerged in all our previous discussions, the problem of heavy teaching commitments and minimum research time has already been mentioned. Extension functions would naturally impose a further load on academics unless organised through specialized extension departments.

The other important function of our programme which in a sense is an extension function is that of contributing technical expertise and advisory services to the Government sector, the Food Industry and to other agencies involved in Food and Nutrition. The contribution to development plans and policies through public committees, whenever technical opinion in specialized fields is required, is a continuing function.

Maximizing Resources

A basic principle of development, that of maximizing all resources was discussed earlier by one of my collegues Mr. Makamure. In relation to food, the need for maximization of food resources cannot be overemphasised and this effort needs to be applied at all levels, at the rural level as well as to commercial food production and processing. To mention a few areas that appear to me as priorities are the identification and development of indigenous food resources and the economic utilisation of waste products and by-products of the Agro and food industry, for human feeding.

A large number of indigenous resources are available but little work has been done on identifying, investigating and

documenting these food resources. Immediately, there is a need for this kind of work. We have commenced a modest effort in this direction and initiated work on local traditional legumes, their nutritive value, storage and processing qualities and on the processing qualities of sorghum. It is equally important to look at existing traditional technologies in order to optimize these processes and the products in terms of nutritive value, safety and keeping qualities. The need for development of intermediate technologies has been emphasised by Dr. Choto.

Traditional technologies.

Two already practised rural scale technologies are those of fermentation and Dehydration. Traditionally, in many African countries milk has been consumed as a fermented sour milk product. So has maize and other cereal porridges. What are the nutritional and other advantages of these products and processes? Likewise, dehydration is applied to a large range of food products, in Zimbabwe, dried vegetables (Mafushwa) dried fish (eg. Kapenta) and dried meat (Biltong). Though these dehydration technologies have been practised for many years they suffer from some inherent deficiencies in terms of efficiency of the process and quality of the product. A project has been initiated by us, in collaboration with the Ministry of Energy for the investigation of these technologies with a view to improving and optimizing the product.

Waste utilisation.

In the commercial sector as well, there are many problems that need to be studied in terms of maximizing utilisation. Currently a number of waste and by-products from the food industry are unutilised or underutilised for human feeding. Soya bean meal, the by-product of the oil milling of soya bean, has not to any appreciable extent been utilised in human feeding despite its high protein content. The whole

bean itself is not widely adopted in the local diets for traditional consumer acceptance reasons. Maize germ another excellent by-product from the maize milling industry currently goes into animal feeds and so does whey from cheese manufacture. All these can and must be upgraded to meet human feeding requirements.

Import substitution.

Maximizing resources also means substituting local resources and foods in place of imported ones, in order to conserve valuable foreign exchange. The Food Industry needs to be actively engaged in a programme of import substitution. This applies to raw materials that have hitherto been imported, packaging materials, minor ingredients and additives. Food Science expertise is needed for the identification and testing of local substitutes.

Work has been initiated within the programme on the replacement of part of the wheat flour in bread formulations by full fat soya flour. With incorporation of soya flour at 12% level and replacement of the wheat flour requirement, a significant savings in foreign exchange (required for the import of wheat flour) could be effected.

Simultanously with efforts at foreign exchange saving there is a push for increased exports and foreign exchange earnings. There is a tremendous potential for increasing the range and value of our food exports. However, we must have the back-up of technical expertise for ensuring good quality and conformity of our export products with international standards.

In closing this discussion I would like to briefly revert to the basic role of the University in man-power training. A question that we academics need to constantly ask ourselves is, while we are training the specialists and professionals,

do we adequately equip them with the tools, approaches and attitudes for active participation in development? In developing countries such as Zimbabwe there is a need for the incorporation of development studies into professional training programmes and in the context of this I quote the case of Tanzania, where Development Studies, including Agriculture Planning and Policy are courses in the B.Sc Agriculture, Food Science and Home Economics Programmes. We need to recognise that the training imparted at the University should not only produce the required level of professional skills but also the orientation to development thinking and policy making in develment programmes. To mention two policy issues in the Zimbabwe situation, that of groundnuts and milk, both highly nutritious foods that are moving from rural production areas to urban markets in exchange for cash - the cash-crop food crop conflict. The rural milk collection schemes while stimulating rural milk production may eventually result in deprivation of the rural producer areas of an essential and nutritious food unless carefully thought out policy measures are adopted. Other anomalies in pricing policies need to be analysed in a technical perspective. For eg. Fluid Pasteurized milk (for urban consumers) is subsidized while long-life sterilized milk (Mainly for rural households lacking refrigeration) is not.

The solutions to such problems do not come from the exercise of technical knowledge alone but from informed and enlightened policy making. It is imperative therefore that the goals and objectives of our training are not geared merely to the production of technical specialists but to people with the insights and capacity for such policy and decision making and active participation in the development process.

Thank you very much for your attention and patience.

Table I.

	Land use for Agriculture (10^6 Hectares)		Other Land		Total
	Communal	Commercial	Forest	Nat.Parks	
Natural Region I.	0.14	0.44	0.07	0.05	0.70
Natural Region 2.	I.25	4.58	-	0.0I	5.86
Natural Region 3.	2.82	3.78	0.I4	0.55	7.29
Natural Region 4.	7.34	4.55	0.64	2.25	I4.78
Natural Region 5.	4.78	3.75	0.07	I.84	I0.44
Total	I6.35	I7.I0	0.92	4.70	39.07
Percentage	42	44	2	I2	I00

Population Distribution

Communal Areas - 57.8%
Urban " -24.0 %
Commercial Farming Areas - I8.2%

Source: Planning Branch of Conservation & Extension,
Ministry of Agriculture.